

AD-A179 978

DEVELOPMENT OF AN OPTICAL FEEDBACK BASED HIGH ACCURACY
BEAM TRANSMISSION METER(U) SEA TECH INC CORVALLIS OR
R W SPINRAD 01 APR 87 N00014-86-C-0784

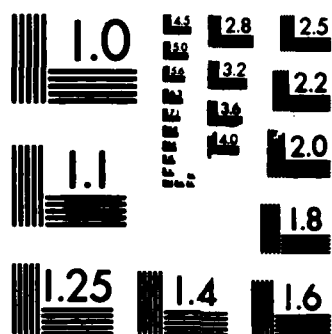
1/1

UNCLASSIFIED

F/G 9/5

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

AD-A179 978

DTIC FILE COPY

(12)

PROGRESS REPORT
to
OFFICE OF NAVAL RESEARCH

1125-01A


CONTRACT NO.: N00014-86-C-0784
TITLE: Development of an Optical Feedback Based High Accuracy Beam Transmissometer
ITEM NO.: 0001AA
DATE: 01 APRIL 1987

DISTRIBUTION STATEMENT A

Approved for public release;
Distribution Unlimited

DTIC
ELECTE
APR 30 1987
S D


Richard W. Spinrad, Ph.D.
Principal Investigator


Richard W. Spinrad, Ph.D.
President
Sea Tech, Inc.
P.O. Box 779
Corvallis, OR 97339
(503) 757-9716

4 7 001

PROGRESS REPORT: Development of an Optical Feedback Based High Accuracy Beam Transmissometer

Sea Tech, Inc.

Contract No. N00014-86-C-0784

Item No. 0001AA, 87MAR31

Two initial aspects of the Phase I SBIR contract have been addressed. The technical details of mechanical and electrical configurations have been solved and some initial testing has been performed on the electrical components. The progress is described in more detail below.

COMPONENT SELECTION AND DESIGN TECHNIQUES

→ The technical problems of determining the best methods for building the optical/feedback-based light source have been solved through procurement of the optimal components and development of adequate design techniques. The detectors that have been selected and purchased are UV-100B, (chips) from EG & G Electro Optics division. These detectors exhibit good thermal stability at 660nm wavelength. The light emitting diodes (LED's) are elliptical devices with peak output of 660nm and a half-power bandwidth of 25nm. These are the same detectors and basically the same light source as presently used in the Sea Tech transmissometers except in chip form. Figure 1 shows the method which has been developed for the mounting and configuration of the source and detector. An elliptical LED has been chosen so as to present a circular cross section when placed at a 45° angle to both the detector and the source pinhole. Headers and caps have been purchased and a method for

mounting the detectors has been developed. Silver epoxy of high viscosity will be used for mounting the chips. Tests of curing times and temperatures have been performed on this conducting adhesive to assure satisfactory mechanical and electrical integrity. Some progress has also been made on potting the entire assembly with an optically clear epoxy.

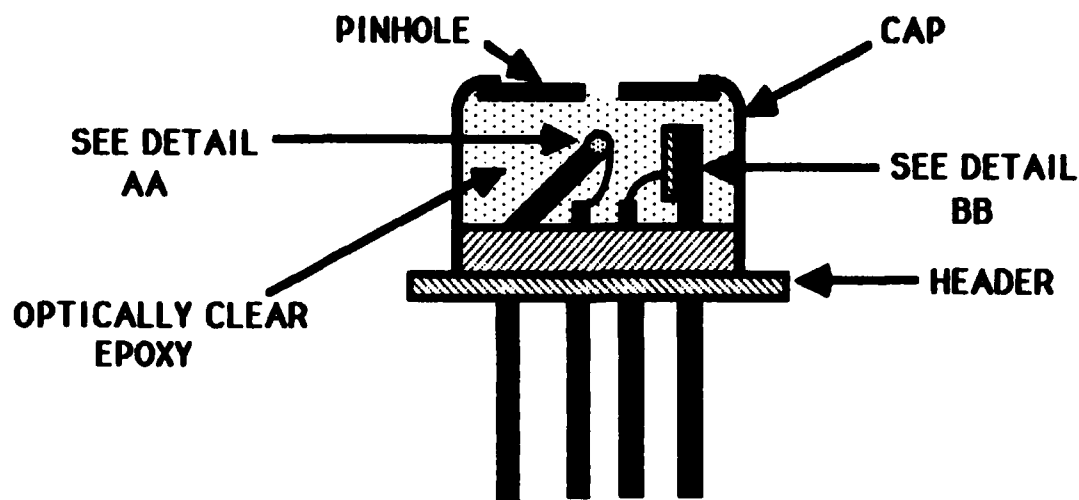
INITIAL TESTING

The prevailing concept of this Phase I SBIR contract is that the transmissometer accuracy can be greatly enhanced through the use of matched detectors in a feedback scheme with the light source. The degree of accuracy is therefore dictated by the matching of the detectors. An integral part of this research involves the testing of the detectors. Tests have been performed to determine the simultaneous response of two independent UV-100B detectors. Using an LED source identical to the one chosen for the final configuration the simultaneous output of the two detectors was monitored at varying temperatures. These tests show that the detectors are matched at 660nm to within 0.1% over the range of 0° to 20°C.

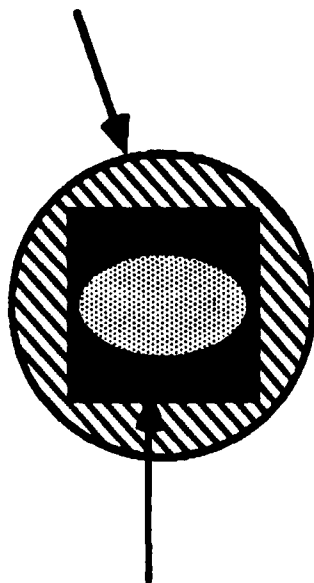
Accession For	
NTIS CRA&I	<input checked="checked" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By <i>lt. on file</i>	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
<i>A-1</i>	



LED & DETECTOR DESIGN



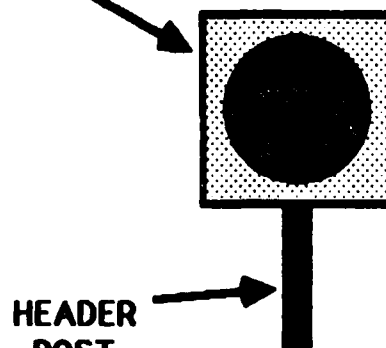
HEADER POST



ELLIPTICAL LED

AA - LED HEADER POST
TOP VIEW

DETECTOR



BB - DETECTOR
FRONT VIEW

FIGURE 1

END

5-87

DTic